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ABSTRACT

A literature review is summarized on the effects of educational and environmental factors on student achievement. Environmental factors include background and community influences, such as social, economic, racial, educational and achievement levels; home environment; and qualities of students, such as academic readiness, motivation, and social behavior. Educational factors are comprised of such variables as teacher characteristics, the structure, of the teaching-learning situations, school facilities, and pupil personnel services. Fifty-five studies are synthesized and the factors which are positively and negatively related to student achievement are summarized. Some of the findings based on a review of American, Canadian, and British research of the relationship of school based factors to student achievement are: direct teaching is more effective than indirect methods, especially in the lower elementary grades and with low socioeconomic status students; indirect teaching may be more effective with older, higher socioeconomic status students and in subject areas like English; teachers' different expectations of students (based on sex and socioeconomic status) perpetuate social stratification and cultural sex differences; experimental instructional approaches show no consistent pattern of achievement gains over traditional materials; and mastery learning is conducive to student success and efficient learning. (MH)

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School-based Elements Related to Achievement: Elements Related to Student Success in Schooling and Education

Executive Summary

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Alberta

Minister's Advisory Committee on Student Achievement

EXECUTIVE SUMMARY

SCHOOL-BASED ELEMENTS RELATED TO ACHIEVEMENT

by Larry Fedigan

- and -

ELEMENTS RELATED TO STUDENT SUCCESS IN SCHOOLING AND EDUCATION

by Gary Gay

Two Reviews of the Literature
Commissioned by the
Minister's Advisory Committee on
Student Achievement

Funded and Administered by the
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Alberta Education

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Fall 1978

PREFACE

The Minister's Advisory Committee on Student Achievement (MACOSA) was established by ministerial order in October 1976 in response to growing concerns expressed by the public at large, government, labor, business, students and educators regarding the quality and standards of basic education in Alberta.

MACOSA commissioned a number of studies, primarily to provide basic information for a summary of current levels of achievement in Alberta and to provide baseline data for future assessment. These studies fell into three categories: (1) preliminary studies, (2) achievement studies, and (3) other studies.

Two of these studies, School-Based Elements Related to Achievement by Larry Fedigan and Elements Related to Student Success in Schooling and Education by Gary Gay, were designed to review the research on educational and environmental factors which may affect student achievement. This report summarizes the findings and conclusions of the researchers.

Summary of Two Reviews of the Literature
on Elements Related to Student Achievement
Conducted for MACOSA by
L. Fedigan and G. Gay

Introduction

The Alberta Goals of Basic Education statement (1978) identifies two types of goals--goals of schooling and goals of education--and states that school personnel should take a primary responsibility for achieving the goals of schooling and a shared responsibility for achieving the goals of education. By making a distinction between "schooling" and "education", the Goals document acknowledges that both educational and environmental factors have a considerable effect on student achievement and that the influence of the school is modified by other agencies and non-school elements. The Minister's Advisory Committee on Student Achievement (MACOSA), also recognizing that such variables are important elements in any decision making about evaluation programs and standards, commissioned two reviews of the literature in this area.

Both Drs. Fedigan and Gay found that the research about the effects of various factors on achievement is inconclusive. These factors are difficult to define and measure, vary from school to school or over time, and their effects may be ambiguous. Furthermore, several of these characteristics can and often do exist simultaneously. For example, low achievement scores could be attributed to all or several of the following factors: socio-economic status, which varies from one area to another; teaching methods, which vary a great deal and are difficult to measure; cultural attitudes towards schooling, which may vary over time. Despite these complexities, the two reviewers agreed that further research is needed to provide as much information as possible to those responsible for developing assessment and evaluation programs.

Both reviewers reported that environmental or non-school based elements (which are often beyond the control of educators) have a substantial relationship to achievement while educational or school based elements may have a less substantial and more inconsistent relationship. Some researchers (e.g., Coleman) have even concluded that teachers do not make a difference, and that classroom instruction has no significant effect on the outcome of schooling. This theory is further reinforced by findings that student aptitude accounts for 15 to 50 percent and home environment accounts for up to 64 percent of the variance in learning. Although most educators would question such an extreme position, these findings could help decision makers to gain a more realistic perspective from which to view student achievement.

All studies reported in the reviews of the literature have examined some aspect of the relationship between or among educational outcomes and environmental and educational factors. "Environmental" factors are those background influences which students bring to school such as type of community including the mix according to social, economic, racial, educational and achievement levels; attributes of the home; and qualities of the student body according to its academic readiness, motivation, and social behavior. "Educational" factors include such factors as teacher characteristics, the structure of the teaching-learning situation, school facilities and school personnel services.

Both reviews point out the significance of the interaction between educational and environmental factors. In practical terms, knowledge about such interaction could permit educators to maximize learning by matching instructional techniques with student characteristics. (See Figure 1.)

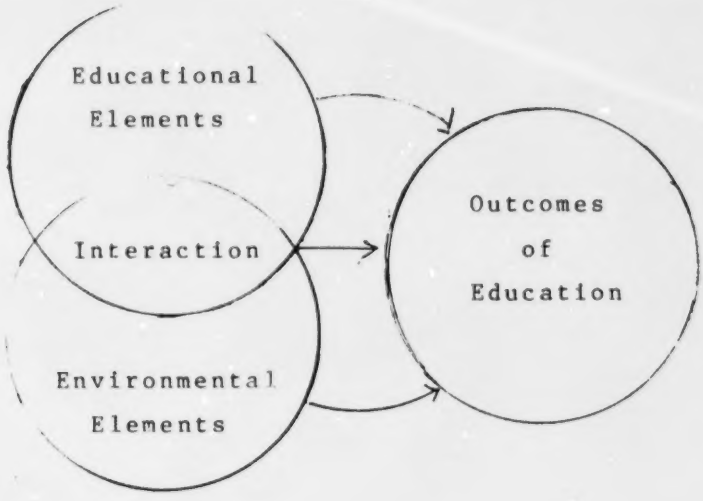

Figure 1. Interaction Between Educational and Environmental Elements

"Elements Related to Student Success in Schooling and Education" by Dr. Gary Gay

Dr. Gay draws together the results of 55 studies, most of which were conducted in the United States. These studies showed that several factors were related to student achievement. It is important to note, however, that these factors may or may not actually cause the results reported. If student achievement increases consistently as attendance increases, there is a positive relationship and if student achievement increases consistently as drug usage decreases, there is a negative relationship. This does not mean, though, that good attendance necessarily improves student achievement or that the use of drugs is detrimental to student achievement. Cause and effect can not be inferred from every such relationship.

The results from Dr. Gay's review are summarized in the following charts.

SOME FACTORS POSITIVELY RELATED TO
STUDENT ACHIEVEMENT

FACTORS	COGNITIVE OUTCOMES	AFFECTIVE OUTCOMES
Population Characteristics	Racial mix	
Community Characteristics	Race and culture	Socio-economic level
Home Characteristics	Socio-economic level (0.26)[1] Median family income (0.88) Living with both parents (0.83) Parents' education Parents' attitude toward children's education (0.56) Parents' ambitions for children's futures (0.46) Parents' aspirations Use of books in the home	Parents' occupations Family impact Community type Parental attitude toward education

[1] When known, correlation coefficients describing strengths of relationships between specified factors and achievement appear in brackets.

SOME FACTORS POSITIVELY RELATED TO
STUDENT ACHIEVEMENT (cont.)

FACTORS	COGNITIVE OUTCOMES	AFFECTIVE OUTCOMES
Student Characteristics	Attitude Educational plans	Race
School Facilities	Library	Library
Teacher Related Variables	Higher teachers' salaries More teacher graduate training Teacher satisfaction related to students Teacher satisfaction related to parents	Teacher satisfaction with students
Structure of the Teaching-Learning Situation	Better control of classes Greater teacher warmth Emphasis on cognitive development More silent reading Higher teacher expectations Higher teacher perceptions Students matched with learning situation	Matching of students with desired learning situation

SOME FACTORS NEGATIVELY RELATED TO
STUDENT ACHIEVEMENT

FACTORS	COGNITIVE OUTCOMES	AFFECTIVE OUTCOMES
Community Characteristics	Larger district enrollment Overcrowded housing (-0.69)	
Home Characteristics	Limited adult educational attainment Larger family size (-0.55) Parents divorced (-0.24)	
Student Characteristics	Juvenile delinquency	Drug usage Part-time work
School Facilities	No library services (-0.53)	Class size
School Personnel Services[2]	More pupil services Special programs for the handicapped	

[2] At first glance one would expect additional services and programs to be positively related to achievement, but in reality such services may exist primarily where achievement is especially low.

SOME FACTORS NOT RELATED OR AMBIGUOUSLY RELATED TO STUDENT ACHIEVEMENT

FACTORS	COGNITIVE OUTCOMES	AFFECTIVE OUTCOMES
Home Characteristics		Material possessions Political and/or religious preferences
Student Characteristics	Attendance rate Sex of student	Educational plans Clique membership Race
School Facilities	School facilities and space Class size Per-pupil expenditures	
Teacher-Related Variables	Median age of teacher	

A bibliography of the particular studies which examined the factors related to cognitive and affective achievement appears in Dr. Gay's report, so that those using the findings may refer to the original articles to ascertain the procedures used in measuring these variables.

Dr. Gay concludes the review with some proposals for evaluation programs which would utilize these and similar findings. He suggests that:

1. Since the educational process is complex, expectations and standards should be identified for students on the basis of educational and environmental factors.

   It is not logical to compare the results of a student from location A and school B with a student from location X and school Y without recognizing the vast number of factors contributing to each student's degree of success.

2. Ways and means of gathering information on the factors contributing to student success should be established for the different areas of Alberta.

3. Alberta Education should give high priority to ways and means of matching students with appropriate learning environments.

"School-Based Elements Related to Achievement" by Dr. Larry Fedigan

Dr. Fedigan did a thorough review of American, Canadian, and some British research on the relationship of school-based elements (teaching behavior, classroom climate, and student characteristics) to student achievement. Such research has been relatively unproductive to date, but its scope has been quite limited. Studies done between the mid-1940's and early

1960's found that teacher traits such as enthusiasm and warmth appeared to promote effective learning. During the 1960's most researchers were committed to the indirect teaching method--that is, making use of student contributions and being democratic rather than authoritarian--and their studies attempted, often without success, to show that this approach was effective in terms of student achievement. More recently, several reviews of the literature have also indicated that indirect teaching is less effective than other teaching approaches. However, five promising teaching behavior variables have been supported by significant results in several studies. They are: clarity, variability, enthusiasm, task orientation or businesslike manner, and student opportunity to learn what is being tested. A further study found consistent results for only four variables. Allowing students the opportunity to learn what is being tested, task orientation, and direct questioning had positive effects on achievement, and teacher criticism had a negative effect.

The Texas Teacher Effectiveness Study (1973-1976) found that the most consistently effective teachers tended to use traditional (or direct) teaching styles. This study also found that students of low socio-economic status seemed to learn best in a controlled atmosphere, while students of higher socio-economic status could also learn well in a less structured environment where teachers challenged and criticized the students more frequently. Many other studies have reinforced the idea that direct teaching (teacher control, emphasis on task, seatwork) is generally effective in lower elementary grades where basic skills are being acquired and with students of low socio-economic status. In other words, it seems important that teaching behaviors be matched with student characteristics for optimal success in learning.

Other studies have explored the differences between teachers of different school subjects, particularly English

and mathematics. Different teaching approaches appear to be more effective for certain subjects--for example, a direct approach may be more suitable in a mathematics class--but the results are not as conclusive as those for the other studies described here.

In general, the research showed that direct teaching is quite effective in certain situations, but that indirect teaching could be more successful with older, higher socio-economic status, or higher ability students, and in subject areas like English. It is not yet known whether these findings are readily applicable to schools in general, and questions remain about the effects direct teaching may have on outcomes other than achievement such as attitude, creativity or social skills.

In 1968 Rosenthal and Jacobson published their controversial "Pygmalion" findings; that is, that teacher expectations strongly influence student achievement. Rosenthal claims not only that the Pygmalion effect exists, but also that it applies to teacher expectations in relation to many student characteristics including sex, ethnic background and socio-economic status as well as aptitude. Teachers' different expectations of boys and girls serve to perpetuate cultural sex differences; and the cycle of low socio-economic status, low ability, low teacher expectations and low achievement continues to maintain social stratification. Such large-scale intervention programs as Headstart in the United States have attempted to break this chain of events by altering teacher expectations and they have succeeded to a certain degree. (Interestingly, in such programs a direct, highly structured teaching approach has again been found to be the most successful.)

Studies that have attempted to find out what curriculum is most effective in terms of achievement or outcome have been

generally inconclusive. New programs or experimental curriculum packages, including programmed or television instruction, have shown no consistent pattern of achievement gains over traditional materials. The use of individualized instruction, both as a curriculum and a teaching approach, seems to be more related to a commitment to the recognizing of individual differences than to efficiency in producing high student achievement levels.

The mastery learning or criterion-referenced approach to individualization, in which each child is given as much time and support as necessary to learn a certain skill or body of information, has been found to be most efficient and productive in terms of use of time. In this case "time" refers to time spent in learning which is not necessarily the same as time spent at school. Using the mastery learning approach, most students succeed and become more efficient learners as well. They learn how to learn. As a result individual differences diminish during the course of schooling, whereas in traditional classrooms individual differences increase over time. These findings about mastery learning reinforce the findings of other studies in which such factors as attention to task and clarity of directions are found to have a positive relationship to achievement.

At the conclusion of his paper, Dr. Fedigan makes several observations which came to mind as he reviewed the research described above. He notes that current research on student achievement seems to be moving away from ideology-based theory and towards the single pragmatic value of efficiency, but that limits must be placed on the means educators are willing to employ in order to achieve a desirable goal. He describes how research is greatly influenced by the social climate in which it operates: the earlier research was tied to the progressive education and "mental health" movements, while present views of learning are influenced by industrial and

cybernetic models which use such terms as "input", "quality control", and "feedback cycles". Since today the school is an area of high financial investment, society has begun to demand that it use the approach taken by business and industry--accountability is the watchword. As a result, the definition of "product" (the outcome in terms of student achievement) has been more and more often limited to pragmatic, short-term goals. Another alternative is to conclude that schooling is not amenable to scientific study. This theory was popular about twenty years ago, when some educators focused on teaching as an art rather than a science, doing case studies of effective teachers and approaching the whole question rather intuitively. Such an approach may be quite valid, but it provides little information which may be applied in any practical way. Also, some current researchers are using ethonographic techniques or client-therapist (human relations) approaches which focus more on the means, assuming that a "good" means will produce a "good" end.

Dr. Fedigan also notes that another concern in this area of research is that if environmental variables can be shown to have more effect on learning than do educational variables, significant economic and political decisions with far-reaching social effects could result. If, however,we conclude from the research that instruction does make a difference, we still need much more research to find how effective instruction can become. And the positive side of recognizing environmental influences is that the school could be freed from its present burden of trying to be the panacea for social ills ranging all the way from malnutrition to pollution. Finally, Dr. Fedigan notes that achievement goals must be carefully examined; in other words, we need to be selective about what outcome criteria we stress. If cognitive and affective learning goals were found to be independent and unrelated to each other in terms of an optimal match of teaching methods, classroom climate, and student characteristics, educators would have to decide which objectives they consider most important.

Dr. Fedigan concludes his report by noting that although some of the research is promising--for example, the interaction between a direct teaching style and 1) socio-economic status with younger pupils and 2) subject matter with older students--more work must be done before any consistent results will be evident in other areas. The research may even show that effective teaching methods cannot be isolated because of the complexities involved, but at the moment we do not know that.

Conclusion

Beyond their use as information for MACOSA, the Fedigan and Gay reports may serve the following purposes:

1. Contribute to the information needs of the educational community.

2. Provide a basis for selecting variables which can or should be considered when evaluating student achievement in Alberta.

Regarding the second purpose, the information in Dr. Gay's paper would assist in developing differential standards in terms of realistic expectations for school performance levels based on the context in which the school is located. (These differential standards would supplement other standards more commonly used in interpreting and reporting results.)

Dr. Fedigan's findings would be useful for conducting evaluations designed to improve instruction rather than to present a report card on performance. Such evaluations would gather information about teaching methods, student characteristics and other such factors along with achievement data and examine the relationships among them, thus reducing the guesswork involved in determining reasons for high or low performance levels.

REFERENCES

Alberta Education. The goals of basic education for Alberta: adopted by the Alberta Legislature, May 18, 1978.

Brophy, J. E. and C. M. Evertson. Low inference observational coding measures and teacher effectiveness. ERIC Clearing House, 1973, ED 077 879. (Re Texas Teacher Effectiveness Study.)

Coleman, J. et al. Equality of educational opportunity. Washington, D.C.: U.S. Document Printing Office, 1966.

Rosenthal, R. and L. Jacobson. Pygmalion in the classroom. New York: Holt, Rinehart and Winston, 1968.